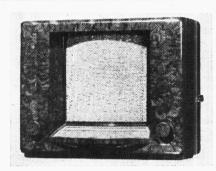
'TRADER' SERVICE SHEET

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PHILIPS V7U

3-BAND AC/DC SUPERHET



THE Philips V₇U is a 4-valve (plus rectifier) AC/DC 3-band superhet with a short-wave range of 16·7-51 m and suitable for mains of 200-260 V (40-100 C/S in the case of AC).

An outstanding feature is the unconventional form of construction used in that the components are mounted direct on to the cabinet, instead of on a chassis.

CIRCUIT DESCRIPTION

Aerial input on MW and LW via isolating condenser C1, coupling coils L2, L3 and coupling condenser C4, to mixed coupled band-pass filter. Primary coils L4, L5 are tuned by C30; secondaries L10, L11 by C32; coupling by condensers C6, C7 and coils L6, L7. IF filtering by L1, C3 across coupling coils. Image suppression by C5. On SW, input is via C1 and coupling coil L8 to single-tuned circuit L9, C32. R1 across aerial circuit provides a DC path between sockets A and E so that C1 cannot develop a charge.;

First valve (V1, Mullard metallised FC13C) is an octode operating as frequency changer with electron coupling. Oscillator grid coils L12 (SW), L13 (MW) and L14 (LW) are tuned by C33; parallel trimming by C34 (LW); series tracking by C14 (MW) and C13 (LW). Reaction by coils L15 (SW), L16 (MW) and L17 (LW).

Second valve (V2, Mullard metallised VP13C) is a variable-mu RF pentode operating as intermediate frequency amplifier with tuned-primary tuned-secondary transformer couplings C35, C11, L18, L19, C12, C36 and C17, L20, L21, C18.

Intermediate frequency 128 KC/S.

Diode second detector is part of double diode triode valve (V3, Mullard metallised TDD13C). Audio frequency component in rectified output is developed across load resistance R7 and manual volume control R8, which also forms part of the load, and passed via fixed tone corrector C20, AF coupling condenser C21 and CG resistance R9 to CG of triode section, which operates as AF amplifier.

Second diode of **V3**, fed from **V2** anode via **C22**, provides DC potential which is developed across load resistance **R13** and fed back through decoupling circuit as GB to FC and IF valves, giving automatic volume control. Delay voltage, together with GB potential for triode section, is obtained from drop along **R17** in HT negative lead to chassis.

Resistance-capacity coupling by R11, C24, R14 between V3 triode and pentode output valve (V4, Mullard Pen36C).

Two position tone control in anode circuit by **S14**, **C26**. Metal grill frame, speaker frame and one side of speaker speech coil **L23**, are connected to socket **E**.

coil L23, are connected to socket E.

When the receiver is used with AC mains, HT current is supplied by IHC half-wave rectifying valve (V5, Philips CYIC) which, on DC mains, behaves as a low resistance. Smoothing is effected by iron-cored choke L22 and large capacity wet electrolytic condensers C25, C27. RF filtering in rectifier anode circuit by C28.

Valve heaters are connected in series, together with scale lamp and current regulating barretter (Philips C1), across mains input. Filter chokes L24, L25 suppress mains-borne interference.

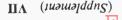
COMPONENTS AND VALUES

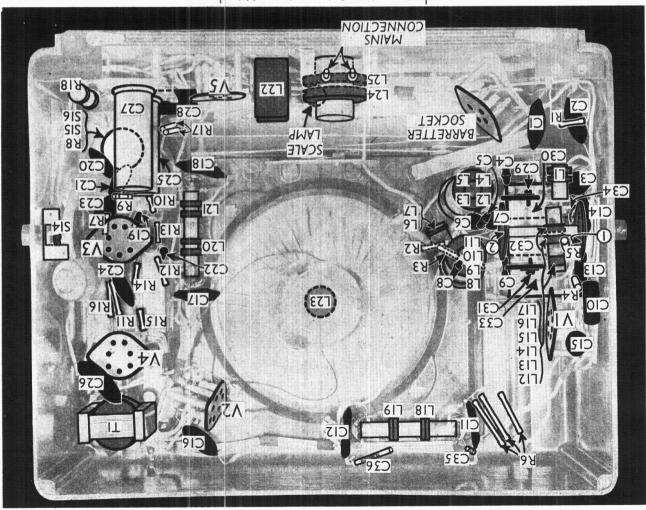
-	JIII OITEITIS AITE TA	
	RESISTANCES	Values (ohms)
Rı	Aerial circuit safety shunt	100,000
R2	Vr pentode CG decoupling	100,000
R ₃	VI pentode grid stabiliser	50
R ₄	VI osc. CG resistance	50,000
R5	Osc. circuit SW stabiliser	40
R6	VI, V2 SG's and VI osc. anode	
	HT feed (approx.)	19,500*
R7	Part V3 signal diode load	200,000
R8	Manual volume control; part	
	V ₃ signal diode load	500,000
Ro	V3 triode CG resistance	800,000
Rio	V ₃ triode CG decoupling	250,000
RII	V3 triode anode load	320,000
R12	AVC line decoupling	1,000,000
RI3	V ₃ AVC diode load	500,000
R14	V ₄ CG resistance	800,000
R15	V4 grid stopper	200,000
R16	V ₄ GB resistance	180
R17	V ₃ triode GB and AVC delay	
,	(approx.)	30†
R18	V5 anode current limiter	125

* Two 64,000 O and one 50,000 O in parallel. † One 125 O and one 40 O in parallel.

Circuit diagram of the Philips V7U. The second IF transformer may have semi-fixed trimmers across C17 and C18 in some chassis. Other possible divergencies are under "General Notes."

For more information remember www.savoy-hill.co.uk





DISMANTLING THE SET

taken out as complete units, if necessary. various sub-assemblies which can be It is not possible to remove the receiver from the cabinet as a whole but there are

of the cabinet. These should be removed, when the speaker can be withdrawn from the front four bolts (with nuts and lock nuts) which hold the speaker to the cabinet. grille covering the speaker aperture can then be removed, exposing the heads of corner of the speaker moulding. The are connected) and then remove the four screws (with washers), one at each Some of the components are held in place with pitch and a similar material place with pitch and a similar material will have to be used for re-fixing them.

Removing Speaker.—It it is desired to remove the speaker from the cabinet, unsolder the speech coil leads (taking a careful note of the points to which they are connected) and then temove the are connected) and then remove the

appropriate fixing screws. three earthing tags are secured by the When replacing, make sure that the

VALVE ANALYSIS

band, and the volume control was at Continued overleas to the lowest wavelength on the medium Valve voltages and currents given in the table (p. viii) are those measured in our receiver when it was operating on AC mains of 230 V. The receiver was tuned for the property on the mains of 250 V.

> semi-fixed trimmers. switch units are shown in detail on page viii. C34, C35 and C36 are Rear view of the receiver, which has no removable chassis. The two

\$.0 0.005 \$.† \$.7 \$.7 0.001 0.001 0.001 0.001 0.001 5.9 \$0.0 0.\$2 0.05 0.52 0.05 2.0 0.52 0.05 5.4 0.05 5.4 0.05 5.5 0.0	Band-pass primary coils	\$17 \$27 \$27 \$27 \$27 \$27 \$27 \$27 \$27 \$27 \$2	
0.06 0.92 0.081	Aerial IF filter coil Aerial MW and LW Coupling coils		
Approx. V alues (ohms)	отнев сомроиеитѕ	-	

	.198-	Slectrolytic, † Variable, † Pre	H *
Ī	0.00003	ist IF trans, sec. tuning	¢36‡
١	0.00003	ist IF trans. pri. tuning	C35‡
١	20000.0	Osc, circuit LW trimmer	C34‡
1	67000.0	Oscillator circuit tuning	C33‡
l	67000.0	sec. tuning sec	
ſ		Aerial SW and band-pass	TSEJ
1	0.000055	Band-pass sec. MW trimmer	C31‡
ı	64000.0	Bainut Vieming eseq-base	C30†
	0.000055	Band-pass pri, MW trimmer	‡6z9
1	1.0	V5 anode RF by-pass.	8s2
	0.28	That TH smoothing	*720
1	20.0	Tone control condenser	920
1	35.0	Part HT smoothing	C25*
1	10.0	V3 triode to V4 AF coupling	Czd
	0.52	V3 triode CG decoupling	Cz3
1	\$900000.0	Coupling to V3 AVC diode	223
1	10.0	AF coupling to V3 triode	C21
-	100.0	Fixed tone corrector	Czo
1	910000.0	Coupling to V3 signal diode	613
1	\$91000.0	and IF trans, pri. tuning and IF trans. sec. tuning	813
	0.000155	animit in such 41 bus	413
	1.0	decoupling Ya CG decoupling	913
	1.0	Dailattooob	CIS
	67100.0	Osc. circuit MW tracker VI, V2 SG's and VI osc. anode	410
	Z000.0	Osc. circuit LW tracker	C13
	\$91000.0	rst IF trans, sec, fixed trimmer	213
	\$\$1000.0	15t IF trans, pri, fixed trimmer	113
	10.0	Vi heater RF by-pass	CIO
	200000.0	Small coupling	63
	100000.0	rəmmiri W2 İsriəA	83
	\$20.0	MW band-pass coupling	45
	910.0	LW band-pass coupling	
	\$0000.0	image suppressor	\$3 \$3
	20000.0	Aerial MW and LW coupling	12
	60000.0	Aerial IF filter tuning	52
	\$00.0	Earth isolating condenser	23
	\$00.0	Aerial isolating condenser	13
			-5
	(An)	G1440144444	
	Values	CONDENSERS	
	1 11		

PHILIPS V7U—Continued

maximum, but there was no signal

Voltages were measured on the 400 V scale of a model 7 Universal Avometer, the can of C25, one of the electrolytic smoothing condensers, being negative.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 FC13C V2 VP13C V3 TDD13C	97 240 36	3*0 (lator 2.2 (2.4 0.7	97 97	4·I
V4 Pen36C V5 CY1C†	235	44.0	240	3.2

† Cathode to chassis, 245 V DC.

GENERAL NOTES

Switches.—S1-S13 are the waveband switches, in two ganged rotary units mounted on the left centre, looking at the rear of the cabinet. They are indicted by numbers in circles and arrows in the inside cabinet view, and are shown in detail in separate diagrams, where the units are seen looking from the righthand side of the cabinet, with the cabinet face downwards. The table (col. 2) gives the switch positions for the three control settings, starting from fully anti-clockwise. A dash indicates open, and C closed.

\$14 is the QMB tone control switch at the left-hand side of the cabinet (viewed from the front). It is closed when

the lever knob is down.

\$15, \$16 are the two mains circuit switches, ganged with the volume control R8, and mounted between it and the front of the cabinet.

Coils.-L1 is in two sections on a tubular former, and is unscreened. L2-L5 and L8-L11 are in two tubular screened units. L6 and L7 are on another small tubular unscreened former, between the two screened units. The oscillator coils. L12-L17 are also unscreened, and are on a tubular former under the switch

The IF transformers L18, L19 and L20, L21 are to the top left and bottom right of the speaker. They are unscreened, and the primary and secondary in each case consists of two coils in series, whose relative position can be altered if alingment becomes necessary.

External Speaker.—No provision is made for this, but a low impedance type could be connected across the internal

speaker speech coil (L23).

Scale Lamp.—This is a special Philips MES type, with a frosted bulb, Part No. 8080. It can be removed and replaced more easily if its holder and mounting bracket are first twisted anticlockwise through 90 degrees.

Resistances R6, R17.—R6 consists of two 64,000 and one 50,000 O resistor in parallel, giving an effective resistance of 19,500 O. R17 consists of a 125 O and a 40 O resistor in parellel, giving an effective resistance of 30 O approx.

Condenser C34.—This is a small condenser consisting of a spiral of insulated wire wound over a thick insulated wire.

Chassis Divergencies.—In our chassis

TABLE AND DIAGRAMS OF THE SWITCH UNITS

Switch	sw	MW	LW
Sı		C	C
$\begin{array}{c c} S_2^2 \\ S_3 \end{array}$		C	
S4 S5	C	C	
\$2 \$3 \$4 \$5 \$5 \$6 \$7 \$8 \$9 \$10	C	C	C
S8 Sq		C	C
Sio Sii	C	-	
S12 S13	c	C	
043			

semi-fixed trimmers (C35, C36) are wired in parallel with the fixed trimmers (C11, C12) of the first IF transformer. makers' diagram shows similar semifixed trimmers associated with the second IF transformer, but they are not included in our receiver.

In the makers' diagram, the screening grids of V1 and V2 are not common as in our set and diagram. Instead, there are two resistors in series between the HT line and the screen of V1 (6,400 and 9,600 O), while **V2** screen goes to the junction of the two resistors, and has a separate 0.1 μF decoupling condenser. Incidentally, the second of the two resistors consists of a 6,400 and 3,200 O unit in series.

CIRCUIT ALIGNMENT

IF Stages.—Feed a 128 KC/S signal via a $0.032 \mu F$ condenser to the control grid of **V2**. Warm the *outer* coils of L20, L21 until the wax softens, by means of a soldering iron. First adjust the outer coil of L21, then the outer coil of L20, until maximum output is obtained. The coils should be moved along the former very slightly, taking care not to break the fine connecting wires.

Next apply the 128 KC/S signal via the $0.032 \,\mu\text{F}$ condenser to the control grid (top cap) to **V1.** In this case the wire-wound trimmers **C35** and **C36** must be adjusted by removing or adding turns until maximum output is secured in each case.

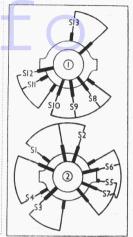
Note.—In some chassis L20 and L21 may also be provided with wire-wound trimmers, in which case these should be adjusted, and not the coils.

Feed the 128 KC/S signal to the A socket via a 0.0005 µF condenser, switch set to LW and turn the gang to 1,875 m. Heat L1, and adjust the spacing of the two coils until the minimum output is obtained.

RF and Oscillator Stages.—Switch set to MW. Rotate adjusting screw of C31 completely clockwise, and that of C29 about half-way. Feed a 1,450 KC/S (207 m) signal via a 0.0005 µF condenser to the A socket, and rotate the tuning condenser until the first signal from the minimum position becomes audible. Adjust the gang accurately for maximum output. Now adjust C29 and C31 for maximum output.

Without altering the tuning condenser setting, switch set to LW. Feed in a 411 KC/S (730 m) signal, and adjust C34 for maximum output. If the capacity is too high, unwind some of the spiralled wire; if it is too low, a new and longer piece of thin wire must be wound over the thicker wire.

Diagrams of the switches, as seen with the set lying face downwards, looking towards the units from the \$14 end of the cabinet.



MAINTENANCE PROBLEMS

Vibration produces Hum

PHILIPS 585U receiver was brought Ain with the complaint that a very loud mains hum occurred at times, usually, but not always, when the set was first switched on. The fault, it appeared, had existed since the set was new, but although various attempts had been made to effect a cure, including the fitting of new valves, no improvement had resulted.

As so frequently happens, the set was switched on and off time and time again, but the noise did not occur once until the cabinet was drastically thumped. After this it was easy to get the noise as one wished, and after all kinds of tests it was concluded that a vibration was the probable cause. This led, of course, to trial and error testing, and ultimately the trouble was traced to the cover of the tuning condenser. This was wedged with a small piece of wood, and the set has been quite satisfactory since.

A possible explanation of the reduced tendency of the noise to occur in different circumstances is that environment may have had something to do with it. The nature of the noise together with the fact that it most usually occurred when the set was first switched on suggested that the condenser cover's resonant, frequency was the same as that of the AC mains.

J. T. HARVEY, CAMBRIDGE.

Re-Soldering Valve Top Caps

HAD in for service recently an Ekco and a Mullard receiver. Both had the same fault, bad crackling after they had been switched on for a few minutes.

On changing the FC₄ valves the trouble was put right. I unsoldered the top caps of the valves, and found dry joints, the cause being that when the valve caps were originally soldered up, air locks were formed.

To prevent this, a small hole should be drilled in the side of the top cap before re-soldering .-- A. S. WATFORD, WINDSOR.